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ABSTRACT

The Preschool Language Assessment Instrument (PLAI) was designed as a diagnostic tool for 3- to 6-year-old children to assess children's abilities to use language to solve thinking problems typically posed by teachers. The PLAI was developed after observing middle-class teachers in preschool classrooms encourage children to use language in different ways. The differences in the use of language were grouped into 4 levels of difficulty, and the PLAI consists of 60 items selected from these 4 levels. The performance of 60 Hawaiian preschool children on this test was assessed at the four levels: (1) Matching Perception; (2) Selective Analysis of Perception; (3) Reordering Perception; and (4) Reasoning about Perception. Overall, the children performed better on tasks at lower levels of complexity than on tasks at higher levels. The group's performance was compared to that of a sample of mainly white upper-middle-class, 3- to 4-year-old children attending private preschools; and to a second sample of primarily black or Puerto Rican lower class, 3- to 4-year-old children attending public day care centers. At all four levels, the Hawaiian children scored to varying degrees higher than the lower class sample but lower than the middle class sample. Eight tables and one figure are included. (BAC)

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Acquiring the Language of Learning: The Performance of Hawaiian Preschool Children on the Preschool Language Assessment Instrument (PLAI)

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Running head: HAWAIIAN PERFORMANCE ON THE PLAI

Report to the Evaluation Department, the Kamehameha Early Education Program, Kamehameha Schools/Bernice Pauahi Bishop Estate, Honolulu, HI. Author's address: Mary Martini, Department of Human Resources, University of Hawaii at Manoa, 2515 Campus Rd., Honolulu, HI, 96822 (808) 956-2249.

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Performance of Hawaiian Preschool Children on The Preschool Language Assessment Instrument

In this report, I describe the make up of the Preschool Language Assessment Instrument. I describe how it was developed and what it was designed to measure. I then report the test performance of 60 Hawaiian children from three preschools. I offer suggestions for instruction based on these findings.

DESCRIPTION OF THE TEST

The Preschool Language Assessment Instrument (PLAI) was developed by M. Blank, S. Rose and L. Berlin as an individually administered test for children 3 to 6 years old. It was designed to assess children's abilities to use language to solve the kinds of thinking problems teachers typically ask them to solve during the early years of school.

The PLAI was designed as a diagnostic tool rather than as a test for ranking children in relation to each other. It is most useful as a tool for developing a profile of each child's strength and weakness on the particular tasks of the test. Test results also provide a picture of the range and clustering abilities within a preschool class.

According to the model on which the test is based, children are asked questions which reflect four different levels of cognitive and linguistic complexity. Each level is made up of ques-

tions preschool teachers commonly ask children. By examine the child's performance at each level it is possible to estimate how well s/he is already prepared to cope with day-to-day questioning at that level. This may help teachers, who are already trying to determine the child's capacities from their day-to-day functioning within the group. The test may represent a simplified, more systematic form of the kind of diagnosis teachers do during group instruction.

The test is based on a set of observations of what children were asked to do with language in a sample of middle-class preschools on the mainland United States. (See Blank, M., Rose, S. and Berlin, L. The Language of Learning: The Preschool Years. Orlando, Florida: Grune & Stratton, Inc., 1978, for details of this study.) The authors converted what they observed in the classrooms into test items.

The test is basically an achievement test. Results indicate how well a child has acquired the particular uses for language which are represented on the test. These reflect the uses the authors observed in the sample of middle-class preschools. Test results do not reflect the child's inherent linguistic abilities, level of language development or capacity to express him or herself in words. Furthermore, it is not clear whether the functions stressed in middle-class, mainland preschools lead to children acquiring more knowledge or more effective learning

strategies. Nonetheless, these are the functions children are asked to perform to succeed in school. In relation to this it is important to assess their incoming familiarity with these functions.

The authors developed an instructional program to complement the assessment instrument. The program is based on the same set of observations and model of preschool language - use as is the test. The program consists of a set of language - use objectives and suggestions as to how the teacher can lead a child through these processes given the level at which the child is functioning. The test provides a picture of what the child can do easily, with some difficulty and with great difficulty. The instructional model suggests how to modify tasks to match the child's level of functioning. The instructional goal is to simplify language demands so that they are just above the child's level of easy functioning, so that the child will confidently stretch to meet the demands. The teacher is to lead the child, step by step, through increasingly difficult language and thinking tasks.

The PLAI differs from many other language tests. It presents complex, multi-faceted stimuli to the child. Other tests are designed, purposely, to limit what the child is asked to do. These tests control for a number of variables while (supposedly) testing just one. The Peabody Picture Vocabulary Test (PPVT) is

designed to assess whether children know labels for common objects and actions and whether they can recognize line drawings as representations of those objects and actions. Language subtests of the CIRCUS assess whether children can comprehend and produce Standard English plural forms, verb tenses, prepositions and conjunctions.

The PLAI is much messier than these tests. It is difficult for an examiner to separate out exactly why a child has succeeded or failed on a particular item. To succeed on any item, the child must: 1) understand precisely what the examiner wants him or her to do [decode the demand]; 2) perform the cognitive operation necessary to solve the problem; and, 3) describe what s/he has done to solve the problem, in an explicit, precise and conventional manner [encode the response]. The item may vary in difficulty due to complexities or unfamiliarities at any one of these stages. The child may have trouble, throughout the test, at one or another stage of the process. Performance is multifaceted and must be carefully examined. On the other hand, the items presented on the test are closer to the messy demands made of children day to day.

Test Design

The authors developed the PLAI after observing middle-class teachers in preschool classrooms. The observed that teachers encouraged children to use language in many ways. Teachers asked

children to verbalized needs, wishes and opinions. They asked them to describe their plans and motivations. The expected them to coordinate play and settle disputes with words rather than actions.

In particular, teachers encouraged children to use language to: a) describe what they saw or heard; b) to think about these experiences; and, c) to explain to others what they were thinking. The authors labeled this the "language of learning," because they saw it as a tool for extending and communicating knowledge of the outside world. Specifically, teachers asked children:

LEVEL I

a. to recognize objects and actions by their labels (e.g., point to the dog; bring me the scissors; show me today's date);
b. to label common objects and actions (what is this called? What is the girl doing?);

LEVEL II

c. to recognize objects by their color, shape or size (Which are the red ones? Show me the square.);
d. to describe objects in terms of color, shape or size (What shape is this? What color is the bird's tail-feather?);
e. to understand the functions of common objects and recognize them by function (Which one do we cut with? Which one do we scrub the floor with?);

f. to describe the functions of common objects (What do we do with a hammer? a car? a cup?);

LEVEL III

g. to sort objects by color, shape, size and function, forming sets (Put all the square ones together. Give me the red ones.);

h. to compare objects to each other in terms of color, shape, size or function to note similarities and differences (Are these the same?);

i. to describe how objects are similar or different, or what the unifying feature of that set is (How are these the same?);

j. to exclude an object from a set in terms of its lack of the unifying feature (Point to all the ones which are not cars);

k. to arrange objects into series (Put these in a row from small to big. Put these pictures in an order which makes sense.);

l. to determine why objects are arranged in rows in the way they are (Why do these sticks go like this [arranged small to big]. Tell me the story of what happens to this glass [It's empty, then partially full, then full]);

LEVEL IV

m. to engage in cause-effect reasoning, such as predicting changes (What would happen to this tower if I took the bottom block away?); explaining changes (Why did the scale tip to this side?); finding a means to an end (If I wanted to carry

all these things at once, what could I use?); and describing causality (Why doesn't the stove work? [The electricity is out]).

Teachers' demands varied in difficulty. Children answered some questions more easily than others. The authors noted these differences and grouped the demands into four levels of difficulty. In the above list, items are arranged from easy to difficult and the four levels are indicated.

From the observations and theories of cognitive development, Blank, Rose and Berlin derived a model as to why demands varied in difficulty. They hypothesized that the larger the number of mental operations the child needed to perform on what s/he saw or heard to solve the problem, the more difficult the problem would be.

For some problems, the child needs simply to label what s/he sees or hears. For other problems, s/he needs to attend to a specific feature of the perception (the object's color or shape). For other problems, s/he needs to do something with that specific perception (such as label it or compare it to the same feature of another object). Difficult tasks require the child to perform many mental operations on what s/he sees or hears. A modification of the authors' model of how task level increases with an increase in number of necessary mental operations is presented in Figure 1.

The PLAI consists of 60 items selected from the four levels. Performance at each level is assessed with 15 items.

Description of levels

To perform the tasks at Level 1, children need only to match or attach words to what they see or hear. They are asked to label, match pictures and imitate simple sentences. The operations tested at Level 1 are labeled "Matching Perceptions."

To perform the tasks at Level II, children need to selectively attend to one or more features of an object rather than to the object as a whole. They need to attend to the color, shape, size or function. In these tasks, language is used to selectively analyze the object into its component features. Level II operations are labeled "Selective Analysis of Perception."

To perform Level III tasks, children need to reorder or mentally do something with what they see or hear. They need to notice and label specific features and then categorize or serrate objects in relation to these features. Level III operations are labeled "Reordering Perception."

To perform Level IV tasks, children need to reason about what they see or hear. They are asked to predict changes, find means to an end, and describe why an event has occurred. Level IV operations are labeled "Reasoning about Perceptions."

Blank, et al. also describe their model in terms of increasing levels of abstraction:

> The teacher is seen as placing demands on the child that require varying levels of abstraction... The level of abstraction is determined by the degree of distance that exists between the material (i.e., the perceptions) available to the child and the language that he or she must understand and use in dealing with that material. Thus, demands that require the child to apply language to salient perceptions are at the lowest level of abstraction (e.g., a question such as, what is this?) while demands that require the child to use language to restructure or to reflect on those perceptions are at the highest level of abstraction (e.g. a question such as, how do you know that...?), (Blank, M., Rose, S., and Berlin, L. Preschool Language Assessment Instrument: The language of learning in practice, New York: Grune & Stratton, Inc., 1978, p.1)

The authors follow a Vygotskian model of the connection between language and cognitive processes. They believe that children are able to develop high-level reasoning skills because they have been supplied a number of lower-level language routines and thinking strategies by their teacher and caregivers. They imitate and practice cognitive strategies by imitating the words of these routines. For example, children learn the words "same" and "different" and apply these before they have grasped the concepts. By repeated use in different contexts they come to an

understanding of the concepts. Within this framework it is extremely important for children to be exposed to such language routines. The test assesses their familiarity with a range of common, middle-class routines. The instructional model suggests ways to simplify tasks to the child's level of functioning. The instructional goal is to lead children through the four levels of complexity.

DESCRIPTION OF TEST RESULTS

In the next sections, I describe the performance of three groups of preschool children on this test. The group consists of 60 children, most of whom are part-Hawaiian. The children attend three preschools, a rural preschool located near the sea, a rural preschool in a mountain valley, and an urban preschool in a low SES section of Honolulu. All schools were located in working class areas of the island. The children were tested in the fall, by the author, a developmental psychologist and language researcher who worked at the Center for Development of Early Education, Kamehameha Schools. The children were tested during morning sessions in a quiet room near their classrooms. Testing sessions were taped. I listened to the tapes to score the tests.

For each level, I describe the tasks involved and how the children performed as a group. I compare the group's performance to that of a sample of upper-middle-class children, and to a second sample of lower-class children. I describe major errors

children made and consider what these might indicate. I report the test-authors' suggestions for instruction.

The upper-middle-class group consisted of 40 children, ages 3 and 4, who took this form of the PLAI, and whose results were reported in the PLAI manual. Those children lived in suburban New York City, and attended private preschools. Eighty-six percent of the children were white. The parents of 63% of these children worked as professionals, executives, business managers or independent business owners. The parents of another 10% worked as technicians, clerical workers, or sales workers. (See Blank, M., et al., The Language of Learning: The Preschool Years, pp. 50-58, for a complete description of these samples.)

The lower-class comparison group consisted of 40 children, ages 3 and 4. Ninety-four percent of the children were black or Puerto Rican. They lived in the inner city of New York City. They attended public day-care centers. The parents of half these children were clerical workers, sales workers, technicians, manual workers, machine operators, skilled or unskilled laborers. The parents of 26% of the children were unemployed. Their results were reported in the Blank book.

Overall Performance

As the model predicted, Hawaiian children performed better on tasks at lower levels of complexity, than on tasks at higher

levels. (See Figure 1). Scores decreased from Level I to Level IV.

All items within a level were not equally difficult. For example, most children missed two memory items at Level I; and most children succeeded on a particular reasoning question at Level IV. The difficulty of an item is effected by many variables: the complexity of thinking the child needs to do; the novelty of the question; the novelty of the materials covered. A few items at high levels were highly familiar to children, e.g.: "What would happen to the man if the closed his umbrella?" A few questions at low levels seemed to catch them off-guard. For example, children were given no warning that they would be asked to remember the pictures they were looking at.

Hawaiian children performed well at Levels I and II. Ninety to 100% functioned in the Moderately Strong to Strong range. They successfully labeled, matched, named colors and shapes, noted similarities and differences, described events in pictures and remembered main features of simple stories. Many questions at this level were <u>what</u> questions. During instruction, most children in this group will be able to comfortably answer these questions if material is familiar.

Level I and II questions become more difficult when they are about new material, when children need to think quickly, or when they need to answer several questions in a row.

The groups' performances dropped at Level III. Less than half the children scored in the Moderately Strong to Strong range. Most Level III questions are how questions. Children had trouble describing how objects were similar and different as well as selecting objects which were not in a named set.

Performance dropped even further at Level IV. Only 7 to 20% of the children comfortably answered these questions. Level IV questions were why, why not, and how do you know questions. Children were asked to predict events, find means to an end and explain carefully. Many children partially understood the demands.

During instruction at this level, many children may be partially or completely lost. This is not to say that teachers should avoid asking these questions. They are important for elaborating thinking skills. However, children will probably need to have Level IV problems simplified into their component parts.

Level I: Matching Perception

Description of tasks

According to the model, tasks at this level are least complex because children are asked only to map words directly onto what they see. They are not asked to perform additional mental operations such as selectively attend to only one feature of an object, compare one object to another in relation to a feature,

or order objects into sets or series. However, to succeed at Level I tasks, children need to pay attention to what the adult indicates is important and they need to cooperate. They are shown objects and asked to match or label them. They are asked to imitate words and sentences. They need to use and understand explicit, conventional labels.

The major tasks of Level I are presented in Table I. These are arranged from least to most difficult in relation to the performance of 96 four-year-olds on longer version of this test (see Blank et al. 1978, pp. 169-171).

Performance of Hawaiian Children

Hawaiian children performance well on these tasks. (See Figure 1). All scored in the Moderately Strong to Strong range. In general, they are comfortable with Level I questions.

The children, as a group, scored higher than the sample of lower-class children on Level I tasks. (See Table 2). Hawaiian children scored lower than the sample of upper-middle-class children.

Task and error-analysis and scaffolding techniques

The children made few errors. Most errors stemmed from difficulties remembering and/or naming pictures they had just seen. Children who spontaneously labeled pictures when looking at them recalled them better. Children had a particularly hard time remembering one set of pictures. These were slightly unusual

objects (an overcoat, baby carriage, toaster, and teapot). Many children seemed not to know their labels. Some remembered the objects by using idiosyncratic labels (the shirt, the stuff for the baby, the microwave, the coffee thing). The children were not given any warning that they would be asked to name the pictures they were looking at. They had no opportunity to apply whatever memory strategies (such as labeling) they may have otherwise used.

Other occasional errors stemmed from leaving out articles, dropping past tense markers (-ed) and inserting Hawaiian-English forms in imitated sentences. For example, instead of saying: "the girl looked out the window," some children said: "Girl look out the window." Instead of repeating, "The bus went down the street," a few children said, "The bus went go down the street." In these cases, children transposed from Standard English to Hawaiian-Creole.

Other occasional errors stemmed from mis-labelling. Some children used imprecise labels. When asked to label a cup, some said "coffee," or "a coffee." The question "What is this?" calls for a precise label for the object pointed to.

Scaffolding in an instructional setting would consist of clarifying the demand: Coffee is what is inside this thing but what do we call this <u>thing</u> (points to cup)?" Other children used the wrong labels. For example, they called a "cup" a "bowl".

Scaffolded instruction would consist of pointing out the difference: "It's like a bowl, but it has a handle so we call it a cup." Instruction at Level I would consist of clarifying conventions of the question-answer formats and teaching common labels.

These children may face two difficulties in learning vocabulary: 1) they may already know different Hawaiian-English labels; and, 2) they may use general rather than specific names for objects. Small distinctions in shape, size and function of similar objects are often reflected in different labels.

Most Hawaiian children successfully matched pictures, pointed to objects named, labeled objects and actions and imitated simple sentences. It is likely that extensive instruction in these area would constitute overtraining, since most children are already competent. However, labeling new objects and events, remembering and naming pictures, and imitating complex sentences are Level I tasks in which children are not yet proficient.

Level II: Selective Analysis of Perception

Description of tasks

According to the model, Level II tasks are more complex, abstract, and distanced than those at Level I. Children are asked to perform mental operations which go beyond seeing and labeling. In particular they are asked to selectively attend to one or two features of an object rather than to the whole object. According to the authors, children must "resist their attraction

to global perceptions and instead respond selectively to different aspects or features of the situation (p. 15)." Instead of attending to the whole, they must attend to color, shape, size, function or position.

Level II tasks are presented in Table 3, from least to most difficult. Children are asked to: a) identify objects by a specific feature: color, shape, size and function ("Point to the red ones"); b) describe characteristics ("What shape is this?"); c) select objects when told tow characteristics ("Point to the large, red one"); and, d) compare objects in terms of color, shape, size or function ("How are these circles different?").

Performance of Hawaiian children

Sixty-five to 95 percent of the Hawaiian children functioned in the Moderately Strong to Strong range. Hawaiian children scored markedly higher than lower-class children at this level, but lower than middle-class children. Seventy percent ranked in the lower 50th percentile using middle-class norms.

Task and error-analysis and scaffolding techniques

The tasks call for attention to detail, knowledge of labels for these details, and a grasp of verbal routines for comparing objects. Most children attended to detail but were confused about specific labels for features and about routines for comparing and grouping objects in relation to their details.

The children scored best on items in which they were asked to name functions or shapes of common objects. They also completed simple sentences.

However, they made some errors. When asked to find "something we cut with," some children pointed to a cut piece of paper. If this error had occurred during instruction, scaffolding would consist of clarifying the question: "That's what we cut, but what do we cut with?" If fill-in-the-blanks questions fail, the adult might turn to multiple choice or yes/no questions: "Do we cut with paper? with a pencil?"

Describing the function of an uncommon object is more complicated. Children need to: 1) attend to the invisible feature-function; 2) imagine what the function might be; and 3) describe this in conventional terms. Some children succeeded at steps 1 or 2, but showed confusion at 3.

For example, the examiner pointed to the screw connecting the blades of a scissors and asked: "What is this part of the scissors for?" Some children attended to the whole object, and said, "scissors." Others attended to a specific feature of the screw, but not that of function: (It's) "a circle," "a hole." Still others mentioned function but did so in vague, unconventional ways: "You open it and for cut it;" "You screw it down, like this."

According to the model, didactic questioning should lead children through the necessary steps: "That's what it's called but what does it do?" "That's what it looks like but what does it do?" The adult would clarify what the child is supposed to do and say. The function of an unfamiliar object, like the screw holding scissors together is difficult to "see" and may need didactic demonstration. "See, this screw goes through this blade and this blade and it holds them together. That's so they can open and shut like this."

Children made most errors when asked to: 1) select an item from an array when told two of its features (the one that's big and closed); 2) describe differences between objects; and, 3) remember events in a story.

When asked to: "Point to the scissors which are big and open," many children attended to only one feature - they pointed to a big or to an open scissors. Scaffolding would consist of directing attention to both. "Is this one big?... Is it open?... Is it big and open?"

Other Level II tasks require children to attend to specific features and to compare objects in relation to them. For example, the examiner asks: "How are these (a bicycle and a tricycle) different?" To answer correctly, the child needs to: 1) focus on details rather than the whole; 2) focus on the size and number of wheels; 3) discern the differences; and 4) use a conventional

format to describe them. For example, "This one's big and this one's small; " "this one has two wheels, this one, three."

Many children performed some but all of the operations. Some labelled the whole percept: "Bicycles." Others focused on specific, but non-salient features: "They got different handlebars;" "This seat and this seat are the same." Others noted the size difference but implied rather than stated it in their responses: "This (points to tricycle) is for the boy; and this one (points to large bike) is for the man ride on the road." "This one (points to large bike), bomby you fall off." These answers indicate that the child sees the differences and relates them to personal experiences but does not use the conventional routines for explicating them.

Scaffolding would consist of leading children through these three processes: 1) to focus on the size and number of wheels; 2) to note the differences; and, 3) to explicitly state the difference.

Other children seemed to have a much less precise understanding of same and different. Some simply pointed to each cycle. Others pointed to each, saying, "different, different." Others gave irrelevant explanations: "'cause you buy 'em at the store;" "'cause I like this kind;" "'cause my brother has this kind."

Another Level II task consists of describing what is happening in a picture. Adequate description include the main charac-

ter(s), action(s) and inferred goals of action, pictured in the scene. Many children named some but not all of the features. To describe a picture of a woman filling a cup for a baby, children said: "a baby girl," "pouring the juice," and "the baby hafta drink." Scaffolding would consist of directing the child's attention to each feature and then encouraging him or her to put these all together "to tell a story about the picture."

Children were also asked to remember main features of a statement, to answer who-, what-, where- and why- questions. For example: "Listen to this. James and Carol walked down the street to see their friend's new car. What were the children's names?... What were they going to see?... Where were they walking?"

Several children seemed not to understand precisely what was asked for. To answer: "What were the children's names?" they said "a boy and a girl." To answer "What were they going to see?" they named people rather than objects. They answered who questions with what information and what questions with who information. To answer "Where were they walking?" some said "across the street" or "to the store", rather than repeating "down the street."

Who-, what-, where-, and why- information exists in many forms. Different question-formats call for different forms. Scaffolding would consist of clarifying the form requested.

"Yes, but what were their names?" "What thing were they going to see?"

Summary: Level II

A majority of the Hawaiian children performed adequately on Level II tasks. They selected objects by color and shape and named colors. Some had trouble naming specific shapes and functions. Children also made errors when asked to select objects by multiple features. Several children had trouble describing major features of pictures or stories. Others had trouble describing differences between objects.

The errors which were made may stem in part from lack of experience with specific question-answer routines and with conventions such as explicitly describing major characters, action and consequences of action in retelling a story. Some children seemed to have a general but imprecise idea of what to do. They seemed not to know the conventions for setting out an answer. Many responses indicated that the child had performed some of the necessary mental operations but not all of them.

Knowing how to mentally solve the problem and how to express this solution in a conventional manner are not the same. Children who showed evidence of solving the problem received partial credit regardless of imprecision expressing this solution. Children received full credit, however, only when they were precise, i.e., when they verbalized all aspects of how they had solved the

problem. According to the model, explicit expression is needed to carry out complex thinking in which words hold stable some variables while children experiment with others.

Level III: Reordering Perception

Description of tasks

According to the model, Level III tasks are even more complex, abstract, and distanced. Children need to perform several operations to respond correctly. In the most difficult tasks, they need to: 1) attend to a specific feature; 2) compare two or more objects in relation to one or more features; 3) to group objects into a set according to a common feature (e.g. color); 4) to exclude an object from a set in terms of its lack of the unifying feature (e.g. color); 5) to name the unifying feature of a set; 6) to arrange objects into series (e.g. by size); and, 7) to describe the rules used to form these series. Blank, et al. state: "With demands at this level (III), the children are required specifically to reject the perceptual or action characteristics that have had such appeal for them and instead internally manipulate or rework their experiences so that these experiences are in accord with the verbal demands of the task (1978, p. 16)."

Level III tasks are presented in Table 3, from least to most complex.

Performance of Hawaiian Children

An average of 45% of the Hawaiian children performed in the Moderately Strong to Strong range on Level III tasks. The Hawaiian children scored markedly higher than the lower-class children. Eighty-five percent ranked in the upper 50th percentiles using lower-class norms. They scored lower than the middle-class children.

Task and error-analysis and scaffolding techniques

According to the model, children need to perform several mental operations to solve Level III problems. Many errors stemmed from doing some of these operations but not all. Scaffolding in an instructional setting would consist of trying to guide them through as much of the series as possible.

Children made most errors when asked: 1) how two objects were similar; 2) to define simple words; 3) to describe what is happening across a series of pictures; and, 4) to pick or name an object which does not fit in a stated set.

Children were asked to note similarities among visually dissimilar objects: "How are a knife and scissors the same?" To succeed, they needed to look beyond visual features to functional features. Then they needed to explicitly state this similarity. Many children failed at one or both components. Some insisted on the visual differences: "No! They are not the same;" "This is a knife an this is scissors;" "They ain't! This is a knife!" Others implied or gestured the function but failed to say it

(e.g. child makes cutting motions with scissors). Others mentioned function but failed to use it to relate the items: "This is a knife and this (scissors) is for cut."

Instruction should focus on helping the child disregard visual differences to focus on more "abstract" similarities: "Yes, they do look different, but they are also alike in some way. ...How are they alike?" If this fails, question the function directly: "What do we do with a knife? ...What do we do with scissors? ...What do we do with both of them? ...How, then, are they the same?

Children were asked to define simple words: "Tell me what a car is." A full-credit answer included the major function of the object. Some children gave associational answers: "a car is a truck;" "a car is a police car." Others mentioned non-salient features without mentioning driving or riding: "for put in the garage;" "you get in accident;" "you cannot start;" "thing that's in the garage and all broken." Others implied function, but did not explicitly state it: "you roll down there;" "on the road." Similarly, children defined a cup as: "round;" "a coffee one;" and "for put juice."

The rule for correct defining, on this test, was to provide enough information to give a naive listener as idea of what the object is for. Children received partial credit for gesturing

driving or drinking, but full credit only when they named these functions.

Children were asked to describe what is happening across a series of pictures of a glass gradually filling up with water. The wording of the question appeared to confuse most children: "Tell me what happened to the glass." Children responded to this phrase with definitive, dramatic happenings: "it broke!" "It cracked!"

However, even when asked, "What's happening to the glass?" several children treated each picture as if of a separate glass, without mentioning the progression: "none, li'l bit, li'l bit, plenty;" "This one get none, this one get some, this one get plenty."

On some items children were asked to imagine a set but then to select an item which was not in this set. They were asked to disregard the set as soon as they had conceptualized it. This was difficult for many. For example: "Circle the ones which are <u>not</u> cups." Many children continued to attend to the newly imagined set, "cups". They circled cups.

Scaffolding in an instructional setting would consist of helping children: 1) imagine the set but then 2) disregard set: "You circled the ones which <u>are</u> cups. ...Look at this one you did not circle. ...Is it a cup? ...No. They're not cups. ...Now show me all the ones which are not cups."

Some tasks were even more difficult because they were purely verbal: "A little girl played with something that was not a doll. What could she have played with?" Some children said, "a doll." Scaffolding would consist of analyzing this task into its presumed parts: "What are some things that girls play with? ...Are these all dolls? ...What's something you said that isn't a doll?"

Some exclusion tasks were particularly complicated: "A lady was in the supermarket and saw something that was not food. What could see have seen?" To solve this, children may need to: 1) think about things seen in supermarket; 2) think about food as a subclass of these things; 3) disattend to this subclass; but, 4) name an item still within the superordinate, supermarket class.

Many children seemed to stop at steps 1 or 2. They either named food ("potato chips") or named items which were not food, but were also not usually found in supermarkets ("a snake;" "a monster"). Some seemed to understand the exclusion principle, but failed to name conventional non-food items as: "She saw a can of not-food." Scaffolding would consist of analyzing the task into component parts, questioning the child about each and asking him or her to put the information back together.

Summary: Level III

To succeed on Level III tasks children need to perform as series of cognitive operations. Many children seemed to perform

one or two of the operations, but failed to complete them all. At this level, both the number and complexity of mental tasks and lack of experience with the conventions for making explicit this thinking may block performance.

Level IV: Reasoning about Perceptions

Description of tasks

Level IV problems were designed to test the child's ability to engage in cause-effect reasoning. These are presented as the most complex, "abstract," and "distanced" demands. Children were asked to: 1) predict changes; 2) explain changes: 3) find means to an end; and, 4) explain elements of causality. They needed to "think about what may, might, could, or would happen to materials. ...(C)hildren must not only use but clearly go beyond the perceptual information so as to reflect on its implications and interpret its significance (Blank, et al., 1978, p. 16). Level IV tasks are presented in Table 7, from least to most difficult.

Performance of Hawaiian children

Only 7% to 20% of the Hawaiian children scored in the Moderately Strong range on Level IV reasoning tasks. The children had trouble either understanding what they were supposed to do, performing the necessary mental operations, or expressing the solution in a comprehensive way.

The Hawaiian children performed better than the lower-class children, but markedly worse than the middle-class children.

Task and error-analysis and scaffolding techniques

To solve Level IV problems, children needed to figure out one or more missing elements inthe causal formula: State 1 + Action = State 2. They were given part of the formula and asked to figure out the rest. On some tasks they were given State 1 and the Action and were asked to predict the outcome (State 2). On others they were given State 1 and State 2 and asked what the cause of this change might have been (Action). On others they were told a current state (1) and a desired state (2) and asked to find a means (Action) to this end.

Most of these tasks seemed to be too difficult for the Hawaiian children. Children responded with a high proportion of irrelevant answers, "I don't know" answers and silences. Some children performed one or two of the "necessary" operations but then become distracted or failed to express their solution in a comprehensive way.

Children had most trouble: 1) figuring out means to an end (75% error rate); 2) making and explaining predictions (74% error rate); and, 3) predicting changes without explaining (57% error rate).

Children were more successful finding means to social ends (Level III tasks) than finding means to ends in the object world.

For example: "The little girl in this picture wants to pat the dog, but the boy is standing in the way. What should she say to him?" Some answers seemed irrelevant: "Say, 'take it easy' to the dog." Others seem ineffective: "Say, 'hello'." Instructional scaffolding would consist of breaking down the task: "What does the girl want to do? ...Why can't she do that? ...What does she want the boy to do? ...What should she say to him to get him to do this?"

Some social tasks were even more difficult. Children were not given the desired "end state". They needed to infer the desired end-state from context. They then needed to come up with the means to this end. For example: "I saw a man this morning whose car was broken and he took it to the garage. What do you think he said to the man in the garage?" The child needed to infer the desired state (a fixed car) and the means to that end. Several responses seemed tangential: "Don't broke my car!" "You naughty man!" and "Stock (=stop?)". Scaffolding would consist of breaking down the task to focus on each presumed step of the reasoning process: "What's the matter with his car? ...What does it need? ...Who can fix it? ...What should the man say to the garage man to get him to fix it?"

But object-world reasoning posed even larger problems. Children were shown a picture of a cup without a bottom end and an array of cut-out shapes. They were asked to "Point to the one

which we could use to fix the cup." Some were disks, others, not. Some disks had holes in them. Children were asked why they picked the one they did.

Many children seemed to understand the general idea of putting the disk in the cup, but not that the disk needed to be impermeable. They picked disks with holes and explained: "'cause it can fit;" "'cause you can leave him in there;" "so thing - juice - can't fall out."

Other focused on holes but chose the wrong disk (a mesh): "'cause it has pukas;" "'cause the thing get holes in it." Opposite answers may indicate the child is on the right track, but confused. Others explained their choices in an irrelevant way: "I <u>like</u> that one." Scaffolding would consist of leading the child through all necessary steps (attending to shape and impermeability) and then encouraging explicit expression. Through routines such as this, children learn the basic rules for presenting a reasoned argument.

Most children had trouble making and explaining predictions. They were asked: "If we filled this bowl to the top with playdough, could we pour these (bag of round objects) inside?" Some seemed to grasp the idea of fullness, but did not express it in an explicit way: "No, 'cause they have plenty;" "no, 'cause then the things gonna take up [space?]" "No, 'cause it going to fall." They failed to make clear exactly what they were refer-

ring to with pronouns such as "they," "the things," and "it." A naive listener would not know what they were talking about.

Others seemed not to grasp the ideas and/or were daunted with the task of explaining it. The focused on irrelevant features: "I like put all those candies inside;" "They're not for eat; they're not candy;" "You want eat 'em;" "Look like a kine grapes."

Many children had trouble predicting changes even when not asked to explain causality. For example: "What would happen to this pile if I took away the bottom spool?" Many children gave imprecise responses: "It would be small;" "It gonna be all gone;" "It got lost;" and "no more!" Others focused on irrelevant features: "They're for sew;' "Fix it and sew it;" "The table might get broken."

Typically, children having trouble expressing a solution, mentioned some element of the solution. Children having trouble solving a problem mentioned irrelevant features.

Scaffolding would consist of clarifying the given information and explicating what the child should do to answer adequately: "See this pile of spools? (gestures what pile means). What would happen to it if I took this bottom one away, like this? (gestures action of doing so)." The adult would mark the important features with gestures. If the child still did not respond,

the adult might demonstrate or ask the child to pull the spool out and see.

Summary: Level IV

Hawaiian children performed least well on level IV reasoning tasks. Their scores were higher than those of lower-class children, but markedly lower than those of middle-class children. There is no danger of over-training these skills - children are not yet proficient. The test-authors advise that for children scoring below 1.0 "most demands in this area should be avoided for they will lead to numerous and repeated failures." (Preschool Language Assessment Instrument: The Language of Learning in Practice, p. 95) However, presenting a high level problem by dividing it into its component lower-level parts, is one way to expose children to important thinking-routines while facilitating their success.

Children showed more skill solving cause-effect problems in the social realm than in the object realm. In spite of the fact that these are presented solely in the verbal mode, children seemed to have a better grasp of social causality and means to a social end than they did of object-causality. In fact, these social story problems are placed at Level III rather than IV in spite of the fact that they test similar processes as those in the object-realm.

Summary: the Preschool Language Assessment Instrument

This test assesses how well children follow the adult lead in cognitive problem-solving routines, involving objects. It does not assess complexity of language or thought per se. To follow the adult's lead in cognitive, object-oriented tasks, children need to understand the pragmatics of the situation. They need to know what the problem is and what they are supposed to do. They need to move through a conventional series of operations, verbally indicating where they are, each step of the way. In particular they must be explicit about what they see, what they are thinking and what they are doing.

These are, to some extent, arbitrary skills. They are the skills children are encouraged to use in Western, middle-class schools. Success in school is probably dependent, to some degree, on acquiring these skills. In view of this it is important to be aware of the precision with which preschool children are expected to formulate, solve and express solutions to problems. Having an approximate idea of what to do and how to do it does not lead to complete success on this test, nor, probably to educational success. One function of language research is to spell out the pragmatic, semantic, and syntactic rules and routines children need to acquire to become competent agents in school.

In viewing children's responses, the examiner needs to distinguish between children who seem not to have acquired the

needed cognitive skills, and those who have not acquired precise ways of explaining their thinking. Both are necessary. The authors argue that a precise vocabulary and set of verbal thinking-routines is crucial for managing higher level processing.

The authors offer a pragmatic model for what to do with test results. One suggestion is to note the tasks on which the class performed well and poorly and to monitor group progress in these areas. Error rates for all tasks are presented in Table 9.

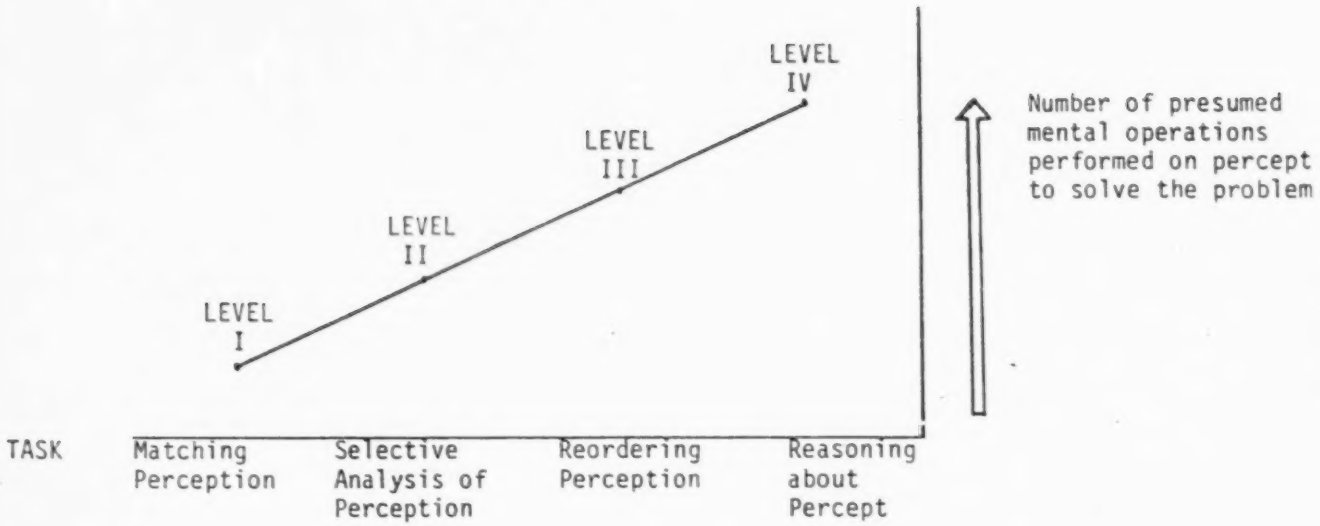
Another suggestion is to notice which children are already performing competently at each level. Children who have strong skills at a level probably do not need extensive practice. Instruction might concentrate on other skill levels, or on asking children to apply lower-level skills to increasingly complex, unfamiliar materials.

Children who are very weak at a level probably are not yet ready for questions at that level. These should be scaffolded or simplified to incorporate easier elements at a lower level. Optimal instruction is said to occur when the demands are just ahead of the child's easy level of performance. Figures 3, 4, 5 and 6 indicate which children have Strong, Moderately Strong, Moderately Weak and Weak performances at each level. These may be useful for planning individual and group language programs.

References

Blank, M., Rose, S., and Berlin, L. The language of Learning: The Preschool Years. Orlando, Florida: Grune & Stratton, 1978.

Blank, M., Rose, S., and Berlin, L. Preschool Language Assessment Instrument: The Language of Learning in Practice.



Modification of model by Blank et al. (1978) of increasing difficulty of language demands

Level I Tasks:

1. labeling common objects and actions (1, 2, 5, 51)
2. matching pictures (29, 37, 59)
3. remembering pictures seen (30, 55, 60)
4. imitating sentences (19, 20, 21)
5. following simple commands (25, 26)

Level II Tasks:

1. finishing sentences (9, 10)
2. describing functions or selecting object by functions (6, 7, 18, 52, 53)
3. describing shapes (54)
4. finding object by 2 features (8)
5. describing differences (17, 57)
6. remembering details of story (38, 39, 40)
7. describing events in a picture (31)

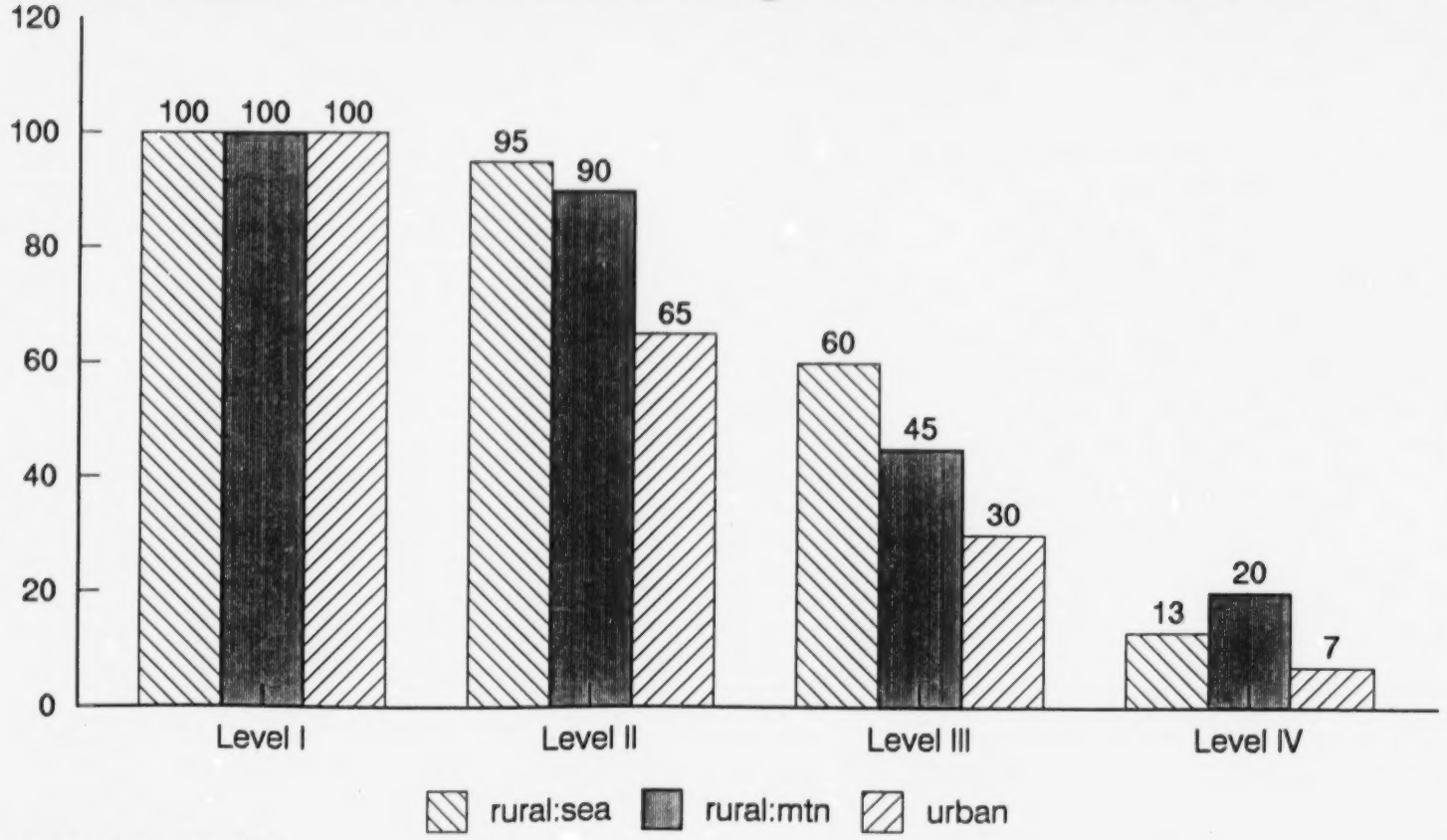
Level III Tasks:

1. following complex commands (4)
2. describing functional similarities (33)
3. finding an object not in the salient set (13, 22, 32, 42, 45)
4. finding an object associated by function (48)
5. what to say in specific situations (3, 14, 15, 43)
   also, imagining what happens in specific situations
6. describing cause in sequence of pictures (44)
7. defining words to include function (34, 35)

Level IV Tasks:

1. describe what will happen if x occurs (16, 23, 24, 28, 36, 41, 46, 47, 49, 50, 56)
2. finds means to an end (11, 12, 27, 58)

Figure 1. Percentage of Hawaiian children in three preschools who scored in the STRONG or MODERATELY STRONG range on 4 levels of the PLAI



(n=60, 4 to 5-year-olds)

TABLE 1

HIERARCHY OF TASKS IN LEVEL I: MATCHING PERCEPTION[1, 2]

THE CHILD USES LABELS TO DESCRIBE WHAT S/HE SEES OR HEARS. S/HE:

1. Understands conventional labels for common objects and actions:

   a. Picks out an object named (Point to the dog; Which is the car?)
   b. Performs an action named (Touch your nose; Show me your shoes)

2. Uses conventional labels for common objects and actions:

   a. What's this called? (for cup, car and scissors)
   b. What's this lady doing? (drinking coffee)

3. Imitates simple sentences:

   a. Say: The boy saw the car.
   b. Say: The girl looked out the window.

4. Matches identical pictures:

   a. Find one down here that looks just like this.
   b. Look at this. Now find one on this page.

5. Remembers objects seen and names them:

   a. What things did you see on that page?

[1] From Blank, M.; Rose, S.; & Berlin, L. The Language of Learning. New York: Grune & Stratten, 1978.

[2] Tasks increase in difficulty from top to bottom.

TABLE 2

COMPARING THE PERFORMANCE OF HAWAIIAN CHILDREN ON LEVEL I TASKS TO THAT OF MIDDLE-CLASS (n=40) AND OF LOWER-CLASS (n=40) CHILDREN

	Compared to scores from middle class sample	Compared to scores from lower class sample
Quartile 1		
0-25%tile	50%	5%
	(10)	(1)
Quartile 2	65%	35%
25-50%tile	15%	30%
	(3)	(6)
Quartile 3		
50-75%tile	5%	35%
	(1)	(7)
Quartile 4	35%	65%
75-100%tile	30%	30%
	(6)	(6)

TABLE 3

HIERARCHY OF TASKS AT LEVEL II: SELECTIVE ANALYSIS OF PERCEPTION[1]

THE CHILD ATTENDS TO A SPECIFIC FEATURE OF WHAT S/HE SEES OR HEARS. S/HE:

1. Picks out an object in relation to a specified feature:

   a. Which one is red?
   b. Which one is square?
   c. Which is the big one?
   d. Which of these do we cut with?

2. Names the requested feature of an object:

   a. What color is this?
   b. What shape are the wheels?
   c. What do we do with this? (for car, scissors)
   d. What is this part for? (windshield wipers, screw in scissors)

3. Names an item in relation to a stated feature:

   a. Name something we eat; cut with; wear.
   b. Finish these sentences:
      1) I like to eat _____.
      2) I like to look at _____.

THE CHILD ATTENDS TO TWO OR MORE SPECIFIC FEATURES OF THE PERCEPT. S/HE:

4. Picks out an object in relation to two features:

   a. Show me the scissors which are big and open.

5. Names an object in relation to two features:

   a. What's something we eat which is red?

6. Picks out and describes the essential details of a pictured scene:

   a. What's happening in this picture(names major characters, actions, and complements: The mother pours juice for the baby)

7. Remembers the essential features of a story and describes them:

   (Remembers who-, what-, where-, when- and why-information)
   e.g. Listen: James and Carol walked down the street to see their friend's new car.
   a. What were the children's names?

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b. What were they going to see?
c. Where were they walking?

THE CHILD COMPARES OBJECTS IN RELATION TO SPECIFIC FEATURES. S/HE:

8. Picks out an object which differs along one dimension:

e.g. S/he responds to the demand: "Show me the one which is different."
a. (Child points to the blue circle among the red ones.)
b. (...to the square among the circles.)
c. (...to the big chair among the other chairs.)
d. (...to the rocking chair among the straight chairs.)

9. Describes how two objects are different:

a. How are these different?
(This is blue; this one's red.)
b. (This one's square; this one's a circle.)
c. (This one's big; this one's small.)
d. (This one's empty; this one's got water in it.)

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[1] Tasks increase in difficulty from top to bottom.

TABLE 4

COMPARING THE PERFORMANCE OF HAWAIIAN CHILDREN ON LEVEL II TASKS TO THAT OF MIDDLE-CLASS (n=40) AND OF LOWER-CLASS (n=40) CHILDREN

	Compared to scores from middle class sample		Compared to scores from lower class sample	
Quartile 1				
0-25%tile	30% (6)		5% (1)	
Quartile 2		70%		10%
25-50%tile	40% (8)		5% (1)	
Quartile 3				
50-75%tile	15% (3)		40% (8)	
Quartile 4		30%		90%
75-100%tile	15% (3)		50% (10)	

TABLE 5

HIERARCHY OF TASKS AT LEVEL III: REORDERING PERCEPTIONS[1]

THE CHILD RECOGNIZES SETS. S/HE:

1. Picks out or sorts objects in relation to a specified feature:

   a. Circle the red ones.
   b. Put the square ones together.
   c. Circle the things that cut.
   d. Put all the toys together.
   e. Circle the one which we can hang this dress on.

2. Picks out or sorts objects in relation to a feature which must be inferred:

   a. Circle the ones which go together.
      (Child sorts by same color, shape, size, function or by functional association (cup with saucer; hammer with nail))

THE CHILD RECOGNIZES NON-SETS. S/HE:

3. Picks out an item which does not belong in a stated set:

   a. Show me the ones which are not red.
   b. Circle the ones which are not cups.

4. Names an item which does not belong in a set which the child must infer from context:

   a. A little girl played with something that was not a doll. What could she have played with?
   b. If I want to dress the doll, which of these things don't I need?
   c. The boy in this picture is all finished riding his bicycle. What do you think he might do next?
   d. A lady was in the supermarket and saw something that was not food. What could she have seen?

THE CHILD DESCRIBES THE UNIFYING FEATURE OF A SET. S/HE:

5. Describes how objects are similar in some way, while differing in others:

   a. How are these the same? (knife and scissors)
   b. How are these the same? (rocking chair and straight chair)
   c. How are these the same? (truck and car)
   d. How are these the same? (apple and piece of cake)

[1] Tasks increase in difficulty from top to bottom.

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TABLE 6

COMPARING THE PERFORMANCE OF HAWAIIAN CHILDREN ON LEVEL III TASKS TO THAT OF MIDDLE-CLASS (n=40) AND OF LOWER-CLASS (n=40) CHILDREN

	Compared to scores from middle class sample	Compared to scores from lower class sample
Quartile 1		
0-25%tile	35% (7)	0% (0)
Quartile 2	65%	15%
25-50%tile	30% (6)	15% (3)
Quartile 3		
50-75%tile	20% (4)	20% (4)
Quartile 4	35%	85%
75-100%tile	15% (3)	65% (13)

TABLE 7

HIERARCHY OF TASKS AT LEVEL IV: REASONING ABOUT PERCEPTIONS[1]

THE CHILD SEQUENCES ITEMS. S/HE:

1. Arranges items in a visually logical order:

   a. Put these in a row which makes sense:
      (Child orders rods from short to long.)
      (...balls from small to big.)
      (...colors from light blue to dark blue.)

2. Arranges pictures in a chronological order:

   a. Put these pictures together in a way that tells a story:
      (Burning candle is tall, shorter, very short.)
      (Piece of cake is whole, half-eaten, plate is empty.)
      (Glass under the tap is empty, half-full, full.)

3. Describes the visual differences between objects put in a series in #1 above:

   a. (Child says: This stick is short, this one is longer, longer.)
      (...this ball is small, this one is bigger, biggest.)
      (...this is light, darker, dark.)

4. Explains why pictures were ordered the way they were in #2:

   (Child says: The candle burned down.)
   (...the boy ate the cake up.)
   (...the water came out of the tap and filled up the glass.)

THE CHILD ENGAGES IN CAUSE-EFFECT REASONING. S/HE:

1. Predicts a change in the structure or position of an object:

   In the formula, State 1 + Action = State 2, the child is shown State 1, is told the Action and is asked to predict State 2.

   a. What would happen to the tower if I took away this bottom block?
   b. What would happen to this scale if I put more balls on this side?
   c. If I filled this bowl with playdough, could I put these grapes in it?

2. Explains what caused a change in State 1. The child is shown State 1 and then State 2 and is asked what happened?

   a. The child is shown the toppled tower and is asked: What happened to the tower? Why did it fall?

b. The child is shown the tipped scales and is asked? What happened to the scales? Why is it tipping on this side?

3. The child finds a means to a stated goal:

In the formula, Current State + Action = Desired State, the child is told the current state and the desired state and is asked to think of a means to reach that end.

a. How can this lady in the picture move all these things at one time? (Put them in the bag.)
b. This little girl wants to pat the dog, but the boy is in the way. What should she say to him? (Please move.)
(This problem in the social realm is ranked at Level III.)

4. Finds a means to an unstated goal:

In the formula, Current State + Action = Desired State, the child is told only the current state. The child must infer the desired state from context, and come up with a means to that end.

a. I saw a man this morning whose car was broken and he took it to the garage. What do you think he said to the man in the garage? (Please fix my car.)
(This problem in the social realm is ranked at Level III.)

5. The child explains why a predicted outcome would happen:

a. Why would the tower fall if I took this block away?
b. Why would the scales tip if I added another ball?
c. Why won't I be able to put the grapes in this bowl?

6. The child explains why a suggested means would lead to the desired outcome:

a. Why would the lady use the bag to take the toys to the next room?
b. Why would the girl say "Please move" to get the boy to move?

7. The child explains why a suggested means would lead to an inferred desired outcome:

a. Why did the man say "Please fix my car" to the man in the garage?

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[1]Tasks increase in difficulty from top to bottom.

TABLE 8

COMPARING THE PERFORMANCE OF HAWAIIAN CHILDREN ON LEVEL IV TASKS TO THAT OF MIDDLE-CLASS (n=40) AND OF LOWER-CLASS (n=40) CHILDREN

	Compared to scores from middle class sample		Compared to scores from lower class sample	
Quartile 1				
0-25%tile	45% (9)		0% (0)	
Quartile 2		85%		35%
25-50%tile	40% (8)		35% (7)	
Quartile 3				
50-75%tile	15% (3)		5% (1)	
Quartile 4		15%		65%
75-100%tile	0% (0)		60% (12)	